

February 6, 1960

15.50 A YEAR

# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Radiation Detector

See Page 57

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WHO IS EDMUND C. BERKELEY? Author of *Giant Brains or Machines That Think*, Wiley, 1949, 270 pp. (15,000 copies sold); Author of *Computers: Their Operation and Applications*, Reinhold, 1956, 366 pp.; Author of *Symbolic Logic and Intelligent Machines*, Reinhold, 1959, 203 pp.; Editor & Publisher of the magazine, *Computers and Automation*; Maker and Developer of small robots: Fellow of the Society of Actuaries; Secretary (1947-53) of the Association for Computing Machinery; Designer of all the Tyniacs and Brainiacs, more than half of the 33 Geniacs (1955); Designer of the patented Multiple Switch Disc and other features in the 1955 Geniac kit.

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- Manual "Brainiacs—Small Electric Brain Machines—Introduction and Explanation" by Edmund C. Berkeley, 1959.
- "Introduction to Boolean Algebra for Circuits and Switching" by Edmund C. Berkeley.
- "How to Go from Brainiacs and Geniacs to Automatic Computers" by Edmund C. Berkeley.
- List of references to computer literature including "Minds and Machines" by W. Sluckin, published by Penguin Books (Baltimore), 1954, 233 pages, and other references.

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## PUBLIC HEALTH

# Develop New Polio Vaccine

New strains of live polio virus vaccine have been developed that hold promise as effective oral vaccines for use in the United States.

NEW STRAINS of live polio viruses appear more beneficial than those used in the live polio vaccine fed to millions of Russians during 1959.

Dr. Albert Sabin of the University of Cincinnati, developer of the live virus polio vaccine recently tested on a mass scale in Iron Curtain countries, reported his success to date with new strains of live virus to colleagues attending the Gustav Stern symposium on viruses in New York. These new strains, which include polio viruses types I, II and III, were taken from healthy children, Dr. Sabin told SCIENCE SERVICE. He referred to them as "cold mutants," or 25-degree Centigrade (77-degree Fahrenheit) mutants.

Experiments with these new strains showed that when doses of these strains were injected into the spinal cord of rhesus monkeys, the animals did not become paralyzed. The monkeys developed neither paralytogenic symptoms nor lesions, the virologist said.

Some monkeys that have been used to test the presently developed live virus vaccine did develop lesions, which, in turn, influenced the U. S. Public Health Service in its decisions to request further testing before recommending use of the oral vaccine in this country.

If Dr. Sabin's new strains will multiply in the intestinal tract of humans, which is essential for the development of immunity, they may replace the strains used in the present Sabin oral vaccine. Tests to determine the ability of these new strains to multiply and create immunity will begin soon, Dr. Sabin said.

He will visit Russia in March. There, Dr. Sabin reported, the Russians are now using the year-old oral polio vaccine developed in Cincinnati. Every person between the ages of two months and 20 years in the Soviet Union, Hungary and Czechoslovakia is receiving the vaccine in either syrup or candy form.

Russian scientists last summer developed a medical bonbon that contains the three types of Sabin live polio virus. The oral vaccine continues to be used in Russia on a wide scale to eradicate polio, Dr. Sabin said.

Three U. S. pharmaceutical firms, Pfizer's laboratories in England, Pittman-Moore of Indianapolis and Wyeth of Philadelphia, are now developing the Sabin vaccine.

These oral vaccines will be tested and ready to submit to the U. S. PHS for licensing by the end of this year, Dr. Sabin predicted.

Other oral polio vaccines have also been developed in the U. S. by Dr. Herald Cox of Lederle Laboratories, Pearl River, N. Y., and Dr. Hillary Koprowski of the Wistar Institute, Philadelphia.

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## Protein Protects Body

AN AGENT produced by the human body that appears to be capable of knocking out the common cold and many respiratory infections was described by a London researcher.

The agent is called interferon by its discoverer Dr. Alick Isaacs of the National Institute for Medical Research. He described his latest findings to more than 150 top virologists attending the international symposium on virology.

Dr. Isaacs foresees the day when local infections such as colds that settle in the head, eyes or throat, could be swabbed or sprayed with interferon, he told SCIENCE SERVICE. The agent, a protein slightly smaller than an antibody, can be produced in monkey kidney cells for human use.

Interferon is produced by disease-causing viruses. It is manufactured by many different animal cells that have been invaded by a virus. The virus-infected cells protect themselves with interferon particles, but confer resistance on other cells.

Dr. Isaacs has found that interferon can be produced from inactivated influenza viruses, fowl plague and Newcastle disease, measles and poliomyelitis. Production of this infection-fighting agent can be assumed to be a property of all viruses, he said. However, interferon produced by viruses that cause tumor growth does not inhibit the growth of the tumor, he found.

Interferon from one virus is active against any other viruses but is much more active in animal cells from the same species. Interferon from cow cells is less active on chicken body cells than on cow cells.

An application of interferon is apparently effective against infections that have already started in the body. Interferon can inhibit viruses without harming body cells, the researcher said.

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## ZOOLOGY

## Sea Otter Pup Receives Tender Loving Care

THE LUCKY sea otter pup probably receives more tender, loving care from its mother than do most mammals.

Like other marine mammals, the sea otter has only one offspring at a time, but unlike the others, the mother gives her young constant attention until it is nearly a year old, reported Karl W. Kenyon of the U. S. Fish and Wildlife Service.

She carries her pup on her chest while she swims on her back. The pup nurses, sleeps and receives almost constant preening from its mother's forepaws.

The mother leaves her pup only for minute-long food dives, Mr. Kenyon said in a report published by the Smithsonian Institution.

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**BEHAVIOR OF ATOMS**—The small glass balls moving on the vibrating plate show how large numbers of atoms can move and interact in solid, liquid and gaseous states. The apparatus was developed by Robert Cormia (left) and David Turnbull (right) of General Electric Research Laboratory, Schenectady, N. Y.

## ZOOLOGY

# "Snowman" to Be Tracked

IF SIR EDMUND HILLARY brings back a specimen of the "abominable snowman" or even a picture of it, it will be the first concrete evidence the world has seen that such a creature exists.

Sir Edmund, the New Zealander who conquered Mt. Everest, will be the leader of a combined British and American expedition that will over-winter in the Himalayas from September, 1960, to June, 1961.

One of the objectives of the expedition will be to get evidence to prove or disprove the existence of the snowman, or "yeti" as the natives call it. Evidence of footprints resembling in some cases those of a huge, broad foot and reports of sightings suggest that further investigation might bring some answer to the puzzle.

Apparently the tracks are made by a being of great weight, walking upright on two feet.

The yeti may turn out to be a huge bear since the prints are also similar to bear tracks. The word yeti in Sherpa language means the "being of rocky places," but the name abominable snowman was probably derived from the word mitch-kangmi. Mite is actually the word for the Himalayan red bear although it has been mistranslated as abominable. Another name for the red

bear is kangmi, which has been translated as snowman.

The yeti hunt will be undertaken with the use of field radios. If any specimens are sighted, attempts will be made to capture one so the world can get a look at this mysterious creature. To facilitate a capture, a special "gun" may be used to shoot a hypodermic syringe with a drug to a distance of 100 yards.

To achieve altitude acclimatization, a team of scientists and climbers will go through a carefully controlled program to discover the maximum height at which men can live for long periods. The greatest test will be a climb of Mt. Makalu, to a height of 27,790 feet without the use of supplementary oxygen.

Physiologists located at lower altitudes, where their mental functions will still be relatively unimpaired by mountain sickness due to lack of oxygen, will receive information on the climbers' pulse rate, breathing rate, etc., by telemetering devices.

The expedition is sponsored by Field Enterprises Educational Corp., publisher of the World Book Encyclopedia. Its members also hope to gather new data on ice strata, temperatures, wind strength and snowfall on the Barun Plateau at 20,000 feet.

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## TECHNOLOGY

# USSR "Super Material"?

RUSSIA is reported to have a "super material" of "fantastic strength" said to be capable of withstanding forces of 1,800,000 pounds per square inch.

This is nearly four times stronger than steel music string wire now available in the U. S. (Music string wire is even stronger than piano wire, which is noted for its strength.)

First report on the material was carried by the Soviet news agency Tass. A later report said Russian researchers achieved the high strength by condensing the atoms of the material. This created "a chain of atoms with no empty space between them as there is in common metals."

News of the development is carried in the *Scientific Information Report* prepared by the Central Intelligence Agency and distributed by the Department of Commerce in Washington, D. C.

If Russia's "super material" exists in sheet form, it may mean that the Soviets could gain an even greater lead on the U. S. in the space race. It would enable Russian space experts to refabricate their powerful, tried-and-proven rockets with the new material and effect great weight savings. This in turn would enable the modified rockets to perform even more spectacular space missions than they already have.

However, Government metal experts at the National Bureau of Standards doubt that Russia's new wonder metal is ready for the production line. Russian scientists have probably duplicated what American scientists have been doing since the early 1950's—grown extremely pure "whiskers" of metal, they said.

These whiskers are so fine they are invisible to the naked eye. A California Institute of Technology professor, Dr. Donald S. Clark, recently reported that the longest whiskers yet grown in Caltech's labs measured only one-half inch.

He said that if a one-inch-square bar of iron could be produced having the same qualities, its tensile strength would run about 900 tons. This agrees exactly with the figure quoted by Tass as the strength of Russia's "super material."

U. S. scientists have not yet found a way to produce slabs of metal with the desirable purity and strength qualities of a whisker.

It is a characteristic of metals, and certain other substances that can be grown in whisker form, that as the cross-sectional area of the sample increases, the strength drops on a pounds-per-square inch basis. This is believed due to molecular imperfections.

The Bureau of Standards scientists said

they would be "very surprised" if Russia had found a way to produce large slabs of ultrastrong materials.

Such an achievement is highly desirable, however, Dr. T. Keith Glennan, head of the U. S. space agency, has suggested that metals with perfectly formed molecular structures may be the answer to building rocket boosters that could be recovered and reused.

Bureau of Standards metallurgists said they did not believe Russia had found any revolutionary way to squeeze up individual atoms and then bind these compressed atoms together.

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## ASTRONOMY

# Ultraviolet "Stars" Found

Rocket probes high above the earth's atmosphere have spotted seven "stars," or nebulous regions, that are apparently emitting ultraviolet light.

THE HEAVENS have "stars" of ultraviolet light that cannot be seen by the human eye but can be spotted by rocket-borne instruments sent high above the earth's atmosphere.

Dr. Herbert Friedman of the U. S. Naval Research Laboratory, Washington, said these sources of invisible ultraviolet can be mapped from rockets or satellites at heights above 60 miles from the earth's surface. An Aerobee-Hi rocket, launched from White Sands Missile Range on the night of Nov. 17, 1959, carried the first ultraviolet telescope used in rocket astronomy—a four-inch instrument from which information was telemetered earthward.

He told the American Physical Society meeting in New York that results from this rocket flight indicate there are at least seven stars that appear to be individual point sources and seven nebulous regions emitting ultraviolet light.

One of the tentatively identified stars is Achernar, the ninth brightest star in the sky. Achernar is four times the diameter of the sun and twice as luminous as the sun in visible light. Its ultraviolet luminosity, however, appears to be less than a tenth of the estimated value expected on the basis of its visible light.

Dr. Friedman said other rockets flown

at heights from 60 to 84 miles have shown that the night sky shines with a bright glow in the ultraviolet light of Lyman alpha radiation. Very preliminary results from a detector sent some 800 miles into the atmosphere indicate that the earth's far atmosphere glows in Lyman alpha during the daytime because of its own halo, but that most of the night sky glow is of interplanetary origin. Lyman alpha radiation is about one-fifth of the wavelength of visible red light.

The night glow, Dr. Friedman reported, is believed caused by atoms of neutral hydrogen outside the night shadow that have first absorbed Lyman alpha emitted by the sun, then re-radiated it in random directions. Some of this re-radiated Lyman alpha reaches the earth's night side.

Dr. Friedman said that the solar Lyman alpha emission shows a deep black core at the center, representing the light absorbed by neutral hydrogen between the sun and the rocket. From the blackness and width of the core, Drs. J. D. Purcell, R. Tousey and P. Mange, also of the Naval Research Laboratory, have estimated that there are about five trillion neutral hydrogen atoms per square inch in a column from the rocket height to the sun.

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## ASTRONAUTICS

# U.S. Space Man Delayed

THE UNITED STATES PROGRAM to put a man in space has already been delayed and the most optimistic schedule is likely to show a timetable "slippage" of many more months before manned space flight is achieved.

However, in its first report on Project Mercury, the House of Representatives Committee on Science and Astronautics concluded that the Mercury program is moving satisfactorily.

It praised the National Aeronautics and space Administration for refusing to set a man-launch date that "might bring the temptation to launch a man before the level of development fully justified this step." Project Mercury is the only U. S. program funded and actually under way for putting man into orbit. The committee questioned whether the national interest is best served by this "all eggs in one basket" philosophy. To offset some of the hazards of this approach, back-up contracts have been let on factors most likely to give trouble.

Advantages cited for this single approach include no competition between parallel programs for research and development

support, for manpower and for critical program items. The Mercury capsule that this year may carry one of seven astronauts into space had to be designed in six months to meet the up-in-space schedule. This required extensive wind tunnel tests, air-drops of full-scale capsules, and rocket flight tests.

"This phase of the program was completed on schedule only because no back-up program of equally high priority was competing," the House Committee's staff report said.

Although a single approach to manned space flight promises to give faster results, the Committee indicated that there are a number of promising approaches and said "the failure to develop in parallel at least one other man-in-space program could prove to be a costly mistake."

Members of the Democratic party's scientific advisory panel has criticized the Government for placing too much emphasis on the Project Mercury program. They urged emphasizing "other, more worthwhile programs," such as world-wide communications and weather satellites.

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**ULTRAVIOLET TELESCOPE**—The four-inch telescope is inserted into the nose cone section of an Aerobee rocket by Edward T. Byram of the U. S. Naval Research Laboratory. It has been flown to 88 miles to make the first measurements of ultraviolet stars as part of the International Geophysical Cooperation.

## FLORICULTURE

## All-America Flowers Named for 1960

YOU CAN have a rocket in your own backyard this summer—it could even be a Vanguard.

The rocket, which comes in six varieties, is an All-America award-winning snapdragon and the first bred for summer blooming and heat tolerance.

Two and three crops per season can be obtained from the same plants which bear ten to 12 tall spire-like spikes filled with blossoms. The plants grow to three feet and come in the following colors: bronze, gold, orchid, red, rose and white.

Vanguard, rose pink with a "golden throat," is the first double snapdragon to merit an All-America award, said W. Ray Hastings, executive secretary of the All-America Selections which sponsors annual open trial-grounds competition for the world's leading introductions in vegetable and flower seeds.

Other All-America award winners include an extra large flowering annual salmon-colored phlox named Glamour.

A big orange marigold called Toreador is also an award winner. It is a carnation-flowered type, with four-inch blooms on a bush that may be as tall as three feet. A second marigold, Spun Gold, bears its three-inch blooms on low bushes that are said to be effective as borders or pot plants.

The only vegetable award winner for 1960 is the Just Right turnip. It is described as having pure white, slightly flattened globe-shaped roots with "vigorous erect leaves."

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## GENERAL SCIENCE

# Washington Trip Winners

(See p. 90)

HOME ADDRESS follows name of school

<b>ARIZONA</b>	
Phoenix Tucson	Edlund, Gayle Ann 17 No. Phoenix H.S. 118 E. Country Club Dr. Hearn, David Russell 18 Tucson H.S. 2215 E. 8th St.
<b>ARKANSAS</b>	
Little Rock	Spitzberg, Irving Joseph Jr. 17 Hall H.S. 307 N. Cedar St.
<b>CALIFORNIA</b>	
La Mesa Los Angeles	Mardis, James Vernon 17 Helix H.S. 4729 Maple Ave. Ramstad, Linda Maria 16 Fairfax H.S. 550½ N. Kingsley Dr. 4
<b>CONNECTICUT</b>	
Stamford	Winfrey, Arthur Taylor 17 Stamford H.S. 46 Laurel Ledge Rd.
<b>DISTRICT OF COLUMBIA</b>	
Washington	Friedman, Samuel Robert 17 Woodrow Wilson H.S. 3722 Appleton St., N.W. 16
<b>FLORIDA</b>	
Coral Gables	Friis, Robert Reaney Jr. 17 Coral Gables H.S. 6175 S.W. 50th St., Miami 55
Gainesville	Platt, William Joshua III 17 Gainesville H.S. Rt. 3, Box 627-A
<b>ILLINOIS</b>	
Evanston	Mills, Richard Pence 16 Evanston Twp. H.S. 2713 Lincolnwood Dr. Klickman, Nancy Ann 17 Marywood School 200 Montgomery Lane, Glenview
La Grange	Eyestone, Robert Bruce 17 Lyons Twp. H.S. 309 N. Edgewood Ave., La Grange Park
Rockford	Rowland James Warren Jr. 17 East Sr. H.S. 404 Sunrise Lane
<b>INDIANA</b>	
Bloomington Evansville	Cuffey, Hazel Rita 17 University H.S. 522 Eastside Dr. David, John Dewood 17 Benj. Bosse H.S. 813 S. Weinbach Ave. 14
<b>MASSACHUSETTS</b>	
Newtonville	Shaner, John Wesley 17 Newton H.S. 9 Bellingham St., Newton Highlands 61
Springfield Winchester	Podosek, Frank Anthony 18 Technical H.S. 28 Pleasant St., Ludlow Baker, Dennis Graham 17 Winchester H.S. 7 Grove St.
<b>MINNESOTA</b>	
St. James St. Louis Park	Spitzner, Jerome George 17 St. James H.S. R.F.D. 3 Brown, David Raoul 16 St. Louis Park Sr. H.S. 4011 Excelsior Blvd., Minneapolis 16
<b>MISSOURI</b>	
Carthage	Underwood, William Edward 17 Carthage H.S. 920 Poplar St.
<b>NEW JERSEY</b>	
Clark	Madey, John Michael Julius 16 A. L. Johnson Regional H.S. 1037 Raritan Rd.
Lawrenceville	Loveman, David Bernard III 18 The Lawrenceville School 462 Palmer Ave. Teaneck
<b>NEW YORK</b>	
Princeton	Mather, John Norman 17 Princeton H.S. 8 College Rd.
Brooklyn	Applebaum, Richard Aaron 16 Erasmus Hall H.S. 2110 Westbury Ct. 25
Croton-on-Hudson New York	Saal, Harry Jerome 16 Midwood H.S. 786 E. 19th St. 30 Bennett, Charles Henry 16 Croton-Harmon H.S. R.R. #1 Heyworth, Geoffrey Dane 16 Bronx H.S. of Science 600 W. 114 St. 25
Patchogue Queens Village	Hochster, Melvin 16 Stuyvesant H.S. 711 Ocean Ave., Brooklyn 26 Wassermann, Gordon Seth 16 Patchogue Sr. H.S. 413 E. Main St. Savio, Robert Richard 17 Martin Van Buren H.S. 79-22 262nd St., Floral Park
Tonawanda	Ash, Barbara Anne 17 Kenmore East Sr. H.S. 204 Briarhurst
<b>NORTH CAROLINA</b>	
Chapel Hill	Straley, Joseph Paul 18 Chapel Hill H.S. 53 Davie Circle
<b>OKLAHOMA</b>	
Oklahoma City	Snarr, Betty Lou 17 Classen H.S. 2020 N.E. 18th St. 11
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<b>WISCONSIN</b>	
Marshfield	Perner, Virginia Violet 17 Columbus H.S. Rt. 4, Box 267
<b>WYOMING</b>	
Cheyenne	Maraldo, John Charles 17 Saint Mary H.S. 3719 Dover Rd.

## GENERAL SCIENCE

## Name 448 Winners In STS Honors Group

THE TOP RANKING young scientists of 1960 have been announced.

As their names were revealed, 448 high school seniors in towns all across the country read congratulatory letters from SCIENCE SERVICE, telling them that they had won a place in the Honors Group of the 19th Science Talent Search for the Westinghouse Science Scholarships and Awards, conducted annually by Science Clubs of America as an activity of SCIENCE SERVICE. (See p. 90.)

Because of the increasing number of outstanding students competing, the size of the Honors Group was enlarged in 1959 to approximately ten percent of the fully qualified entrants. A total of 4,477 students completed entries and thus were qualified for judging in the current search.

The 448 members of this Honors Group range in age from 15 to 19, and go to school in 244 communities in 42 states, one of which is Alaska, and the District of Columbia.

They rank high in their high school graduating classes, with 72% of the boys and 85% of the girls in the top five percent of their classes. The rank of first, second or third in the class has been attained by at least 28% of the boys and 48% of the girls. Since the ratio of girls among the Honors Group is determined by the number of girls completing entries, 100 of these outstandingly competent pre-scientists are girls, while 348 are boys. All of them will be recommended for admission and scholarship awards to the nation's colleges and universities.

On Feb. 2, some of the recipients of the letter of congratulation heard even happier news when the top 40 winners of the Science Talent Search were announced and invitations sent out for the five-day Science Talent Institute to be held in Washington, D. C., March 3 through 7.

During the Institute, the winners will be judged for \$34,250 in Westinghouse Science Scholarships and Awards. These Scholarships and the operation of the Science Talent Search are supported by the Westinghouse Educational Foundation of the Westinghouse Electric Corporation.

Many of the Honors Group will receive further recognition in state Science Talent Searches conducted on a local level as part of the national Search.

The creative enthusiasm of these science-minded students is evident in the research papers they submitted as part of the stiff entrance requirements. Like some of the world's eminent adult scientists, these young people are exploring such important fields as space medicine, new uses of electronics, free radicals and the physiology of the cell.

Anyone may have a copy of a booklet containing the names of the Honors Group by sending a long, self-addressed envelope bearing an 8¢ stamp to Science Clubs of America, 1719 N Street, N.W., Washington 6, D. C.

## ELECTRONICS

# Can Replace Transistor

THE CONCEPT of molecular electronics may lead to development of a complete communications receiver the size of a pea.

The concept is said to "leapfrog" over current attempts to make electronic systems smaller and more reliable. Its further development may mean the eventual elimination of such components as resistors, capacitors, diodes and transistors.

The technique, demonstrated by the U. S. Air Force and Westinghouse Electric Corporation in Washington, D. C., "grows" semiconductor crystals in the form of long, thin, near-perfect ribbons, or dendritic strips. The dendrites can be incorporated into finished semiconductor devices without intermediate material processing of any kind.

Westinghouse scientists have grown multi-zone crystals, called "functional electronic blocks," that provide the basic building blocks required in molecular electronic systems. Each one is a complete functioning electronic sub-system.

A variety of working sub-systems shown were vastly more reliable than the most advanced electronic devices in use today and as much as 1,000 times smaller.

Dr. S. W. Herwald, Westinghouse vice-president in charge of research, demonstrated an amplifier used in a high fidelity phonograph in which the pre-amplifier was

the size of a match-head and the power amplifier was small than a dime.

"If this can be accomplished now," he said, "it isn't difficult to foresee development of a complete communications receiver the size of a pea within a few years."

Also shown was a wafer-sized direct current power amplifier that required only the energy from a flashlight beam to control 40 watts of power for two 12-volt automobile headlamps.

New systems employing these concepts, the demonstrators pointed out, could be operational in missiles or satellites in three to four years to perform such functions as telemetering light intensity or radiation levels back to earth and providing infrared detection and reconnaissance information, flight guidance and communications.

To construct molecular electronic systems, Dr. Herwald said, it is first necessary to determine the desired electronic functions to be performed and then build those functions into a single piece of semiconductor material such as silicon or germanium.

By such techniques as plating, etching and alloying, the structure of the tiny solid piece is arranged to perform the identical functions that now require many individual components that have to be soldered together.

Science News Letter, February 6, 1960



**MOLECULAR AMPLIFIER** — *This tiny unit performs the same function as a conventional standard amplifier. Developed by Westinghouse Electric Corporation in co-operation with the Air Force, such units are as much as 1,000 times smaller than electronics devices now in use.*

## GEOLOGY

## Tundra May Have Lined Edge of Great Glacier

FOR YEARS scientists have held that great spruce forests extended to the very edge of the great glacier of the ice age. Now a geographer from Michigan State University at East Lansing, Mich., is disputing this claim.

Dr. Dieter H. Brunnenschweiler contends that the area just south of the glacier was similar to the treeless plains of the Arctic, a tundra covering a broad cross-section of the U. S. from Oregon and northern California to the Middle Atlantic states.

As evidence, he points out that stone formations in this belt are similar to those found in the Arctic tundra, where frost is in the ground all year. Other tundra-like conditions, he says, include lakes without outlets in Delaware and eastern Maryland, which he believes were depressions formed by freezing and thawing processes.

The theory that the area south of the ice cap was forest, the geographer maintains, was formed by biologists and was based on findings of spruce pollen supposedly dating back to about the time of the last ice advance. Dr. Brunnenschweiler, on the other hand, thinks the spruce trees migrated southward as the glacier advanced.

There is general agreement, he adds, on what temperatures prevailed south of the glacier. Estimates based on the depth and distribution of former frost activity in the ground indicate the average low was zero to 10 degrees Fahrenheit and the average high was 40 to 50 degrees. This matches with temperatures in present tundra, the researcher notes.

Science News Letter, February 6, 1960

## MEDICINE

# May Aid Cancer Treatment

## See Front Cover

A NEW RADIATION detector, smaller than the head of a pin, is expected to have important applications in the treatment of cancer.

The device, which measures the number and energy of atomic particles traveling at extremely fast speeds, is also expected to have uses in space exploration, military science, nuclear power control, industrial process control and basic physical research.

Known as a "solid state ionization chamber," it was developed by Hughes Aircraft Company, Los Angeles, and a report on the device was recently presented before the American Physical Society in New York.

The detector, seen on the cover of this week's SCIENCE NEWS LETTER, is essentially a slice of "doped" silicon so thin it is barely discernible to the eye. When struck by a charged nuclear particle, it emits a pulse that can be measured and analyzed. The detector's value lies in its ability to make measurements that up to now could not be made. Dr. Stephen S. Friedland, Hughes physicist, reported.

The detector is said to have five major advantages over earlier devices. It is so small that it can be packaged in the tip of a hypodermic needle. It requires no

cumbersome power pack because it operates at very low voltage.

Furthermore, it can detect particles 1,000 times faster than previous devices and is so accurate that it can analyze particle energy to less than one-half of one percent error. Ordinarily tiny, the device could be made larger for alpha particle detection in low radiation level areas.

Dr. Friedland described the potential use of the solid state detector in the treatment of cancer. Boron, an element that tends to concentrate in malignant tissue for a limited length of time, would be injected into a cancer patient. The detector, imbedded in a hypodermic needle, would be inserted into the diseased area.

The patient would then be exposed to a stream of neutrons. When the boron reached its heaviest concentration, neutrons striking it would create alpha particles that would flash through and destroy diseased tissue.

The detectors would spot the alphas and determine when boron concentration reached its peak and how long it lasted. This information would be transmitted instantly to readout devices, allowing technicians to plot precisely future treatment and to determine the minimum effective exposure to radiation.

Science News Letter, February 6, 1960



## PSYCHOLOGY

**Electric Shock Improves Learning Ability of Mice**

EARLY infantile experience affects the ability of a mouse to learn as an adult.

Baby mice taken from their nests, handled, and carried to an experimental apparatus and there given a mild electric shock have increased learning scores.

Drs. Victor H. Denenberg and Robert W. Bell report in *Science* (131, 227, Jan. 22, 1960) that young mice are especially sensitive to such effects at two to three days of age. Their learning scores as adults are affected even when the baby mice are taken from the nest and carried to the shock apparatus and back without having any shock administered.

The animals were tested for learning ability as adults by sounding a buzzer, followed five seconds later by an electric shock. If the mouse made an appropriate response before the onset of the shock, the electric shock did not occur and the mouse was credited with an "avoidance response." The mice that were shocked at a very young age were better at learning to avoid the shock as adults, provided the shock was not too strong.

Drs. Denenberg and Bell were at Purdue University, Lafayette, Ind., when they conducted this research but Dr. Bell is now at Allegheny College, Meadville, Pa.

*Science News Letter*, February 6, 1960

## BIOCHEMISTRY

**Isolated DNA Changes Normal Cell to Cancerous**

A NUCLEIC acid believed to be the basic "stuff" of chromosomes—has changed a normal cell to a cancerous one.

This is the first time that an isolated nucleic acid has produced cancer, a team of researchers reported in the *Proceedings of the National Academy of Sciences*. The discovery points to the possibility that a different DNA could cause a change in the opposite direction from cancerous to normal cells, the researchers said.

Earlier studies had shown that RNA, or ribonucleic acid, isolated from plant or animal viruses will cause infections in healthy cells. (Viruses are known to consist of either RNA or DNA, as deoxyribonucleic acid is called, coated by a protein. It is the nucleic acid that causes the virus disease.)

The DNA in this study was isolated from a polyoma virus of leukemic mice. The virus produces almost 24 types of cancer in various laboratory animals.

First the virus was grown, then its protein "jacket" removed and the virus nucleic acid injected into embryo cells. An infection resulted that was characteristic of the one produced by the whole, intact virus. Also, the scientists reported, all hamsters that were injected with the tissue culture medium had tumors.

However, as soon as the enzyme DNase—which destroys DNA only—was added to the isolated nucleic acid, it became non-infective. This proved it to be of the DNA

type. Direct injections of nucleic acid also produced tumors in hamsters.

Drs. G. A. DiMayorca, C. Friend and A. Bendich of the Sloan-Kettering Institute for Cancer Research in New York City, and Drs. B. E. Eddy, S. E. Stewart and W. S. Hunter of the National Institutes of Health reported on the DNA cancer discovery.

Reported in the same issue of the *Proceedings of the National Academy of Sciences* is the discovery that DNA reproduces itself in the same way whether it is found in bacteria or more complex, one-celled plants called algae.

This supports the scientists' belief that what is learned about bacteria and viruses can be applied to higher organisms such as algae and even mammals, Dr. Noboru Sueoka of the Harvard Biological Laboratories indicated. He showed that when a green alga cell divides into two "daughter" cells, they share each of the original parent's DNA molecules.

*Science News Letter*, February 6, 1960

## ROCKETS AND MISSILES

**Thin, Flat Space Saucer Could Fly on Sunlight**

A THIN, flat, spinning saucer made of aluminum-coated plastic membranes may be the space exploration vehicle of the future. It would run on sunlight.

Dr. Theodore Cotter, University of Michigan physicist, told the Institute of the Aeronautical Sciences meeting in New York, that this device appears to be "an extremely promising concept for space propulsion."

Dr. Cotter said there are no major technical obstacles to an early trial of such a device.

He said the first step would be to launch a small saucer of 600 feet to 900 feet in diameter as an experiment to test the idea. It would be instrumented, but carry no passengers. If it proved itself, a larger one later could be used to carry passengers on space trips without using any fuel other than the pressure exerted by sunlight and the pull of the sun's gravity.

By adjusting its angle with respect to the sun, the saucer could mix the push of sunlight with the pull of the sun's gravity so that it could go in any desired direction in the solar system.

Dr. Cotter said a saucer big enough to carry a man in its passenger pod, deep within, would probably measure more than 1,300 feet in diameter. Its useful payload, including a man, would be about 1,000 pounds.

The space saucer would have to be launched into orbit by a conventional rocket. But once in an earth orbit, it could adjust its angle to spiral slowly away from earth on a space mission, then later return to its earth orbit.

An immediate application of the idea, Dr. Cotter said, might be to equip conventional earth satellites with smaller versions of this "solar sail." These sails could be used to make small or large changes in the satellite's orbit without help of rockets.

*Science News Letter*, February 6, 1960

**IN SCIENCE**

## GENETICS

**Gene of Fruit Fly Has Great Variability**

A SINGLE fruit fly may contain many of the genetic possibilities found in thousands of flies. It has an "unexpectedly great portion" of all the genetic variation found in the population to which it belongs, a University of Michigan zoologist reports.

An experiment was made tracing one variation—crossvein defect—in the offspring of 21 wild pairs of fruit flies. Results seem to support the theory that "presently observable steps in evolution are made through new combinations of common genes" that have already been tested by natural selection, Dr. Roger Milkman said.

Twenty-one "pregnant" female fruit flies were collected from their natural habitat—grocery stores, Dr. Milkman reported in *Science* (131, 225, Jan. 22, 1960). The offspring in 21 groups were then inbred to produce 1,000 second generation flies. These were examined to see how much of the crossvein defect, which is determined by presence of some rather common genes in rare combination, appeared.

Half of the 21 original flies produced at least one fly in a 1,000 with crossvein defects that ranged from slight to complete absence of the posterior crossvein in the wing.

Results like these should be borne in mind in the consideration of the many human traits that are determined by several genes, concluded Dr. Milkman.

*Science News Letter*, February 6, 1960

## AERONAUTICS

**All-Weather Sub-Killing Can Be Done by 'Copters**

NAVY TESTS have proved conclusively that helicopters can be used day and night and under all weather conditions to find and "kill" submarines.

Helicopter flight tests under instrument flying conditions, were made from the decks of modern carriers against evasive submarine targets.

Lt. Donald B. Bennie of the Naval Air Test Center, Patuxent, Md., told the Institute of the Aeronautical Sciences meeting in New York that submarine-hunting helicopters must be flown automatically by electronic computers.

Computers must be used because the processing rate for instrument information at a low-altitude hover is beyond the experienced pilot's ability, he said.

The tests also showed the guarding missions for aircraft carriers becomes "highly successful" through use of all-weather helicopters.

*Science News Letter*, February 6, 1960



# THE FIELDS

## PHYSIOLOGY

### Tranquilizers Lower Rats' Cold-Stress Resistance

SEVERAL widely used tranquilizers reduce laboratory rats' ability to withstand extreme cold, a Harvard University researcher reports.

Tests with serotonin and vasopressin indicate that the drugs cause responses in treated animals similar to those found in animals lacking their adrenal glands. The survival time of cold-stressed animals in the three groups was similar, Dr. R. Michel Zilberstein points out in *Nature* (Jan. 23).

This suggests that treatment with these drugs results in a temporary "cutting out" of the adrenals as far as the glands' normal functioning is concerned.

Reserpine "clearly differs" from the other tranquilizers, Dr. Zilberstein says. Its effects were still evident 18 hours after the rats were injected, even though by that time most of the drug is known to have been used up or metabolized by the body.

Variations in the survival time of untreated animals subjected to the extreme cold at different times of the day appear to reflect the daily cyclic changes in adrenal activity, Dr. Zilberstein concludes.

In the experiment, rats were placed in individual cages in a cold room at about 37 degrees Fahrenheit, either immediately following injection with a tranquilizer or, in some cases, 18 hours afterwards.

Science News Letter, February 6, 1960

## MEDICINE

### Prescribing Tranquilizers Called Doctor Disease

PHYSICIANS appear to be prone to a new disease—writing up prescriptions for tranquilizers.

Actually, they are pressured into doling out tranquilizers by forces that include the practitioners' own mind plus patients, mothers, colleagues, detail men, samples and selected literature, Dr. Morgan Martin, formerly of Regina General Hospital, Regina, Sask., reports in the *Canadian Medical Association Journal*. (82, 133, Jan. 1960.)

The doctor cites the dangers of tranquilizers, among which were their side effects, drug dependency, habituation and addiction. He suggests that doctors adopt a code of "thinking" about tranquilizers so that they will be better prepared to withstand the deluge of claims that accompany each new product.

The Canadian doctor advises physicians to keep in mind the various pressures which influence his decision to prescribe these tension-relieving pills.

First, there are four types of doctors that

fit into the group prone to prescribe tranquilizers. The doctor who cannot communicate with patients and has great difficulty in talking; the doctor who has nothing to offer as an alternative to the tranquilizer; the doctor who wants to please, and lastly, the doctor who cannot stand anxiety.

Then, he continues, patients who have read a popular article about the pills will pressure the doctor. So will parents and relatives of the patient and colleagues. Next, free samples, detail men and "selected literature," favorable to the product, of course, attempt to erase from the physician's mind any doubts about the benefits of the pills.

In conclusion, Dr. Martin suggests that doctors need to keep in mind and understand the pressures pushing them towards prescribing tranquilizers and to know how to evaluate them. Dr. Martin is now at Upper Saddle River, N. J.

Science News Letter, February 6, 1960

## ASTRONAUTICS

### Long Trip to Mars Now Too Strenuous for Man

MAN DOES NOT appear to be able to remain in a space ship for the length of time it would now take to cruise to Mars.

Perhaps ships will have to travel much faster, cutting down on the number of "space hours" a man spends hopping from planet to planet. Such short planetary missions may be the only possible method of keeping a man alive in space, Dr. Hubertus S. Strughold suggested in summarizing a series of lectures on space medicine at Brooks Air Force Base, Tex.

Presently United States scientists are planning methods of sending missions to other celestial bodies by means of minimum-energy trajectories, the adviser for research at the School of Aviation Medicine at the Base said. In this manner the space craft "coasts" in space. Thus, a round trip to the moon would take less than one week. Providing a man with food, water and oxygen during such a flight would pose no serious problem.

On the other hand, a flight to a planet such as Mars would require almost nine months with present propulsion systems, Dr. Strughold reported.

This length of time would pose many problems. Tests to date on men in cabins such as those that will be used in space flight indicate such lengthy flights would cause intolerable psychological and physical changes.

The entire environment inside the cabin would need recycling. Food and water supplies would have to be supplied by this intricate recycling system. Tests already run indicate that a man in the cabin begins to grow weary of the experiment after only seven days.

The solution, Dr. Strughold suggests, is a shorter mission-period, which means faster powered space craft. He also suggests applying continuous flight acceleration to the craft once it is space-borne.

Science News Letter, February 6, 1960

## MEDICINE

### Healthy Hearted Bantu Still Puzzles Scientists

EXACTLY why the African Bantu is relatively immune to severe atherosclerosis remains a mystery, but eight researchers have virtually eliminated low coagulability as a possible answer.

Many scientists have suspected that the low incidence of atherosclerosis might be due to a particular property of the Bantu's blood—slow coagulability. They reasoned that since white men suffer a high incidence of heart disease coupled with rapid coagulability of the blood, the low coagulability of the Bantu might explain the African people's low rate of heart disease.

But after careful observation of the blood of a group of white controls and of Bantus, which included comparisons of both their coagulability and clot dissolving properties, the eight scientists report in the *British Medical Journal* (Jan. 23) that they found no significant differences. Research was directed by Drs. C. Merskey, H. Gordon and H. Lackner, who were assisted by Dr. V. Schrire, Dr. R. Sougin-Mibashan, B. J. Kaplan, H. L. Nossel and A. Moodie, all from the departments of medicine and surgical research at the University of Cape Town.

The Bantu thrives on a diet lacking many of the nutrients considered essential for good health. Despite that, or perhaps because of it, the natives are relatively free from heart disease, certain types of cancer, diabetes, peptic ulcer and appendicitis.

Atherosclerosis, a form of hardening of the arteries, is very rare in the Bantu and, when it does exist, it seldom leads to heart disease as in Americans.

Science News Letter, February 6, 1960

## AGRICULTURE

### Number of Farm Tractors Increases 70% in Decade

THE NUMBER of farm tractors in the world has increased by about 70% in the past decade. During the same period, the farm horse population has dropped by seven percent.

The number of tractors in 1957, excluding Russia and Red China, had gone up to 8,728,000 against 5,149,000 in 1949, the Food and Agriculture Organization of the United Nations has reported.

Ninety-three percent of the world's farm tractors are concentrated in North America, Europe and Oceania. The remaining seven percent are spread over various countries in Latin America, the Far East, and Near East and Africa, regions that account for 65% of the world's arable land.

Four reasons cited by the FAO for the expansion in farm mechanization were more favorable prices for farm products, the rising cost of agricultural manpower, a greater variety of machines more suitable to local conditions, and increasing machine-consciousness coupled with wide-spread government encouragement.

Science News Letter, February 6, 1960

## GENERAL SCIENCE

# Score Your Aptitude in Science

Hundreds of high school students, boys and girls, recently completed an aptitude exam as the first step to qualify them in the 19th Annual Science Talent Search.

By SHIRLEY MOORE

IN A FEW minutes you can get some idea of whether you have the kind of scientific aptitude that wins national recognition and college scholarships for talented high school students.

As an experiment, try this shortened version of the famous Science Talent Search test on yourself and on your family and friends. This 20-minute version will give you a quick indication of the scientific possibilities of anyone from a high school student to an octogenarian.

The full length, two-and-a-half-hour Science Aptitude Examination, like this sample, is designed to measure "ability to think and reason in terms of scientific concepts and vocabulary," according to the authors of the annual test, Dr. Harold A. Edgerton, New York consulting psychologist, and Dr. Steuart Henderson Britt of Northwestern University.

(Allow yourself 20 minutes to complete the sample, then check your answers with those given in the answer box on p. 94.)

If you have answered all of these questions correctly, you fared better than any of 203 Science Talent Search contestants selected at random.

Awarding two (2) points for each correct answer in Parts A and B, and one (1) point for each in Part C, a high score on the short version would be 22 or more out of a possible total score of 38. Of the 203 random selections, 58 students did this well or better. A low score would be 13 or less. Forty-three students did this poorly.

Based on the results of this random sample of contestants, the easiest questions were 5, 50, and 71. Each of these was answered correctly by 77% or more of the 203 students. Questions 72, 73, and 101.6 were the hardest. Each of these was answered correctly by 13% or less of the students.

The most difficult question was 72, which was answered correctly by only 8.8% of the students. The easiest, 50, drew correct answers from 83% of the 203.

You should not be discouraged if your score is not "glittering" in comparison with those made by these unusually able teenagers. The test is intended to qualify only the best among thousands of students, and no one ever has made a perfect score. In addition, you probably are not as thoroughly in the test-taking groove as a high school senior who has just finished college entrance examinations and a number of qualifying tests for various purposes.

All the selection techniques of the Science Talent Search for the Westinghouse Science Scholarships and Awards, conducted for 19 years by Science Clubs of America,

## PART A

DIRECTIONS: Four possible answers are given for each question. Choose that answer which is most nearly correct. Record your answer by putting an X in the answer box corresponding to your chosen answer.

- In the northern hemisphere, the direction of winds around a high-pressure center and around a low-pressure center are respectively
  - clockwise : clockwise
  - clockwise : counterclockwise
  - counterclockwise : clockwise
  - counterclockwise : counterclockwise
- At the lowest known temperature (almost absolute zero), every element and every compound except one is a solid. Which one is it?
  - helium
  - hydrogen
  - nitrogen
  - oxygen
- The term "molecular engineering" refers to
  - control of chemical reaction through electronic computers
  - designing of nuclear reactors
  - developing chemical compounds to fit specific needs
  - developing industrial materials from farm crops

- A level of 100 decibels, a very loud noise, has been found lethal for some animals. This occurs through
  - causing malfunction of the liver
  - impairment of hearing
  - raising body temperature
  - reduction in sleep

- Yttrium's advantage in the nuclear field is "its relatively low thermodynamic cross section." This means that
  - it has less resistance than many other materials to the passage of neutrons needed to sustain a nuclear reaction
  - it is highly resistant to the passage of neutrons
  - it takes very little of this material to contain an active reactor cell
  - its melting point is high enough to withstand reactor temperatures

- A Venn diagram is the graphical representation of
  - a cross section of a plant's stem or leaves
  - the air flowing over an airplane wing
  - the efficiency of a pump
  - the relationships between sets

- Zelite crystals are not useful as
  - carriers for volatile catalysts
  - dehydrating devices
  - semi-precious gems
  - separators for different types of molecules

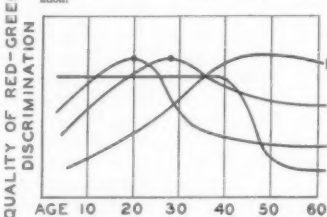
## SECTION G

It has been generally accepted that color vision is congenitally determined, that there is little change with age (principally in blue discrimination due to the effects of increasing pigmentation in old age), and that young people should have the best color discrimination.

Lakowski's recent study shows that red-green color discrimination is at its best at about the age of 20, that yellow-blue discrimination is superior around the age of 20, it suggests that children of 10 have poorer red-green discrimination than they will again have until they reach 50. Impairment of yellow-blue discrimination does occur after 25 but more severely than is generally supposed. Violet-bluegreen discrimination shows a surprising change in early childhood and diminishes very sharply after 40 or 45.

## QUESTIONS ON SECTION G

- Which of the curves in the accompanying diagram best represents the relationship of age and red-green discrimination?



- curve A
- curve B
- curve C
- curve D

- The typical pattern of growth and decline of color discrimination with age is
  - good-good-poor
  - good-poor-good
  - poor-good-good
  - poor-good-poor

## PART B

- On the basis of the paragraphs, which of the following statements is most nearly true?

- More people have poor yellow-blue discrimination than have poor red-green discrimination.
- Older adults have less adequate color discrimination than persons in their thirties.
- Poor color discrimination in early childhood does not mean poor color discrimination as an adult.
- There is greater age difference than sex difference in ability to discriminate color.

- "Color discrimination is congenitally determined and hence it remains fairly constant throughout the life of an individual." According to the paragraphs this statement is
  - consistent with experimental results
  - false
  - generally accepted but not true
  - true

## SECTION N

There is a number system whose numbers are of the form (a, b) where "a" and "b" can be any positive integers including zero. Two numbers in this system, (a, b) and (c, d), are equivalent if  $a + d = b + c$ . There are two operations in this system, "K-ing" and "Q-ing" as follows:

$$(a, b) K (c, d) = (a + c, b + d)$$

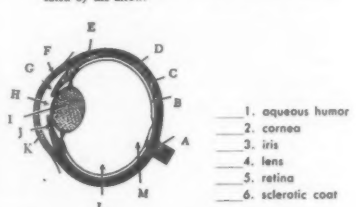
$$(a, b) Q (c, d) = (ac + bd, ad + bc)$$

## QUESTIONS ON SECTION N

- (5, 9) Q (7, 3) is equivalent to
  - (12, 12)
  - (2, 78)
  - (50, 90)
  - (78, 82)
- (7, 2) K (4, 15) is equivalent to
  - (4, 10)
  - (3, 58, 113)
  - (11, 18)
  - (22, 34)
- [(9, 12) K (10, 11)] Q (x, y) is equivalent to
  - (5 + 2x, 5 + 2y)
  - (23x + 25y, 23y + 25x)
  - (x, y)
  - (25x, 23y)

## PART C

- Below is a diagram of a vertebrate eye. A number of parts are indicated by arrows, each identified by a letter. For each part in the list on the answer sheet, put the letter of one of the arrows in front of the name of the part indicated by the arrow.



- Select the number of the achievement mentioned in Column II and write it in the parentheses at the left of the name of the scientist (Column I on Answer Sheet) associated with it.

## COLUMN II

- developed theory of electrolytic dissociation
- devised the quantum theory of light
- discovered argon, neon, xenon, krypton
- discovered methods of tissue culture
- formulated electromagnetic theory of light
- initiated the periodic table of the elements
- measured the charge of the electron
- produced first wireless waves

## Column I

- ( ) 1. Svante Arrhenius
- ( ) 2. Alexis Carrel
- ( ) 3. Heinrich Hertz
- ( ) 4. Dimitri Mendeleev

MEASURE YOUR TALENT—This is a short version of the two-and-one-half-hour examination for the 19th Annual Science Talent Search.

have been developed to discover and encourage the most promising young research scientists among the nation's high school seniors.

Scores on the Science Aptitude Examination represent the first hurdle in the judging procedures. There is no predetermined "passing" grade and scores are plotted on a curve to discover which contestants may be qualified for further judging. This qualifying score for boys in the 19th Search was 143, 130 for girls. This allowed a large margin, for the highest score among the boys was 211 out of a total possible score of 244. Highest score among the girls, who made up 22% of the entrants, was 198.

As the next step, detailed scholastic records of each student who "passed" the examination were evaluated. Then evidence presented by the student and by his faculty sponsor concerning his activities, drives, hobbies, personality traits and attitudes was weighed carefully to find any of a number of combinations of achievement and promise.

Each entrant is required to submit a written report of an individual research project, usually consisting of a thousand or so words of text, plus relevant diagrams, theorems, pictures, etc. The papers of all students who had survived the first hurdles of the Search were read critically by a board of professional scientists which included specialists in the many fields explored by the student-scientists. This board worked its way through everything from an idea for a flat video display panel for television to the use of dithionates to trace esterification reactions with primary, secondary and tertiary alcohols.

Then these professional opinions were added to the other evidence for and against each candidate.

Correlating all of these evaluations, the board of judges selected an Honors Group of 448 students (ten percent of those with complete entries) who showed outstanding scientific potential and who will be recommended to colleges and universities for admission and scholarship aid.

To choose 40 top winners from this Honors Group, each detail was re-examined and weighed on an even more precise scale of values. During the Science Talent Institute, to be held March 3 through March 7 in Washington, D. C., the known data on each of these 40 will be supplemented significantly by personal interviews and weighed again in selecting the five who will be awarded Westinghouse Science Scholarships ranging from \$7,500 to \$3,000. (See p. 86.)

Some of the traits and abilities prominent among these outstanding young people are intense intellectual curiosity, ingenuity, self-discipline, wide scope of interest and an intuitive grasp of why and how facts may relate to each other.

During the five-day Science Talent Institute in March, the 40 winners will meet eminent scientists, visit scientific laboratories of unusual interest, and be interviewed by the judges. The Westinghouse scholarships and awards are announced at a banquet at the close of the Institute.

The five scholarships of \$7,500, \$6,000, \$5,000, \$4,000, and \$3,000 and 35 awards of \$250 may be used at any accredited college or university and will help to assure

these young pre-scientists of professional training in their fields. Recognition in the Science Talent Search brings many thousands of dollars in other scholarship offers to the Honors Group. In addition, 34 states and the District of Columbia conduct State Science Talent Searches in cooperation with Science Clubs of America, awarding some \$600,000 in scholarships to students from their states who were qualified entrants in the national Search.

Science News Letter, February 6, 1960

## OCEANOGRAPHY

### Bathyscaph Descends To Deepest Part of Ocean

THE U.S. NAVY bathyscaph Trieste has descended to a record depth of 37,800 feet to the bottom of what is believed to be the deepest part of all the world's oceans.

The descent, well over seven miles, is considerably farther below the surface of the sea than Mt. Everest, at 29,028 feet, is above.

The dive was made Jan. 23 in the Marianas Trench in the Pacific, an area previously believed to have been only 35,000 feet deep. Aboard the Trieste were Navy Lt. Don Walsh and scientist Jacques Piccard, whose father, Auguste, designed and built the bathyscaph.

The descent took 4 hours and 48 minutes and the ascent, 3 hours and 17 minutes. During the half hour spent at the bottom the bathyscaph's hull was under a pressure of 16,883 pounds per square inch, yet no difficulties were reported encountered during the dive.

This record penetration of the ocean's unknown areas was the third in a series of dives made in recent months. The other two dives were descents to then record depths of 18,600 feet and 24,000 feet.

The series of dives is providing the Navy with scientific knowledge of sunlight penetration, underwater visibility, transmission of man-made sounds and marine geological studies. Results are expected to have wide scientific and military implications.

Science News Letter, February 6, 1960

## Questions

**ASTRONOMY**—How is night glow caused? p. 85.

**ELECTRONICS**—How is molecular electronics expected to replace transistors? p. 87.

**MEDICINE**—What important disease is very rare in the Bantu people? p. 89.

**PUBLIC HEALTH**—What is interferon? p. 83.

**ZOOLOGY**—What does the word "yeti" mean in the Sherpa language? p. 84.

Photographs: Cover, Hughes Aircraft Company; p. 83, General Electric Company; p. 85, U. S. Navy; p. 87, Westinghouse Electric Corporation; p. 90, Science Service; p. 96, Shade Pulls, Inc.

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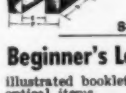
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**ADVANCES IN CLINICAL CHEMISTRY**, Vol. 2—Harry Sobotka and C. P. Stewart, Eds.—*Academic*, 387 p., illus., \$12. Ranges from a review of hypercalcemia of infancy to consideration of automation in the hospital laboratory.

**ADVANCES IN VETERINARY SCIENCE**, Vol. V—C. A. Brandly and E. L. Jungherr, Eds.—*Academic*, 450 p., illus., \$14. Treats examination of eye operations in animals, Q fever, rabies, theilerioses, and tissue culture.

**AFRICA IS ADVENTURE**—Attilio Gatti—*Messner*, 249 p., photographs, \$4.50. Adventures while photographing wild animals at close range.

**ALGEBRAIC THEORIES** (Formerly Titled: Modern Algebraic Theories)—Leonard E. Dickson—*Dover*, 276 p., paper, \$1.50. Reprint of 1926 edition.

**AMERICAN FOLKLORE**—Richard M. Dorson—*Univ. of Chicago Press*, 328 p., \$4.50. Survey of America's folklore, from colonization to mass culture.

**ANIMAL-GLUE TESTING FOR PAPER SIZING**—P. B. Davidson and H. B. Bodenhagen—*Mellon Institute*, 14 p., illus., paper, free upon request direct to publisher, 4400 5th Ave., Pittsburgh 13, Pa.

**A BIRD IS BORN**—E. Bosiger and J. M. Guilcher—*Sterling*, 92 p., 111 photographs by E. Hosking and R. H. Noailles, \$2.50. Close-ups and X-ray photographs graphically portray the life cycle of birds.

**THE BIRTH OF A NEW PHYSICS**—I. Bernard Cohen—*Doubleday*, 200 p., illus., paper, 95¢. From Copernicus to Newton, shows how a major modification in any one part of the physical sciences must eventually produce changes throughout.

**A BUTTERFLY IS BORN**—J. P. Vanden Eeckhout—*Sterling*, 90 p., photographs by author,

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**CLASS IN AMERICAN SOCIETY**—Leonard Reissman—*Free Press*, 436 p., \$6.75. Systematic analysis of what class means for American society.

**COMPUTERS AND PEOPLE: Business Activity in the New World of Data Processing**—John A. Postley—*McGraw*, 246 p., \$6. Explains what modern computers can do for business, in non-technical language.

**CURIOSITIES OF ANIMAL LIFE**—Maurice Burton—*Sterling*, 128 p., illus. by A. M. Jauss, photographs, \$3.95. Picture-stories making clear the great diversity among birds and beasts.

**FAA STATISTICAL HANDBOOK OF AVIATION**—Federal Aviation Agency—*GPO*, 11th ed., 140 p., paper, 60¢. Review of aeronautical progress and reference volume.

**THE FACE OF THE EARTH**—G. H. Dury—*Penguin*, 223 p., illus., paper, \$1.25. About river-patterns, volcanoes, beaches and mountain formations.

**THE FIRST BOOK OF ASTRONOMY**—Vivian Grey—*Watts*, F., 68 p., illus. by G. Geygan, \$1.95. For young readers.

**FUNDAMENTALS OF ELECTRONICS**—E. Norman Lurch—*Wiley*, 631 p., illus., \$8.25. Thorough introduction to the field, directed towards the non-engineer.

**GENETICS AND CANCER**—Staff of M. D. Anderson Hospital and Tumor Institute, Eds.—*Univ. of Tex. Press*, 459 p., illus., \$8.50. Papers presented at Thirteenth Annual Symposium on Fundamental Cancer Research, 1959.

**GESTATION: Transactions of Fifth Conference**, 1958—Claude A. Villee, Ed.—*Macy*, 262 p., illus., \$5.75. Among others, discussions of circulation in the placenta, and its biology.

**A GUIDE TO STEREO SOUND**—David Tardy—*Pop. Mechanics*, 192 p., illus. by Art Lutz, photographs, \$4.95. Emphasis is on basics of stereophonic reproduction.

**HANDBOOK FOR SPACE TRAVELERS**—Walter B. Hendrickson, Jr.—*Bobbs*, 256 p., illus. by J. Russell, \$3.95. History of rockets, and current and future space programs, for young people.

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**LIGHT AND PLANT GROWTH**—R. van der Veen and G. Meijer—*Macmillan*, 161 p., illus., \$8. Import from Holland, surveys present state of knowledge about photobiological processes that take place in plants.

**LIMPE CHEMISTRY**—Donald J. Hanahan, Frank R. N. Gurd and Irving Zabin—*Wiley*, 330 p., \$10. Examines and evaluates progress made during the last ten years.

**MAN AND LEARNING IN MODERN SOCIETY**—Clark Kerr and others—*Univ. of Wash. Press*, 200 p., \$5. Papers and addresses delivered at the inauguration of Charles E. Odegaard as President of the University of Washington, 1958.

**THE MEASUREMENT OF GRASSLAND PRODUCTIVITY: Proceedings of the University of Nottingham Sixth Easter School in Agricultural Science, 1959**—J. D. Ivins, Ed.—*Academic*, 217 p., illus., \$7. Primarily concerned with techniques of measurement.

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**THE MIND READERS: Some Recent Experiments in Telepathy**—S. G. Soal and H. T. Bowden—*Doubleday*, 290 p., \$3.95. An account of experiments with two young Welsh boys which, the authors believe, demonstrated telepathy.

**MINERALS YEARBOOK 1958**. Vol. I: Metals and Minerals (Except Fuels). Vol. II: Fuels. Vol. III: Area Reports—Staff of Bureau of Mines—*GPO*, 1230 p., 484 p. and 1065 p., \$4, \$2.25 and \$3.75. Record of performance of the Nation's minerals industry.

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**NATIONAL SCIENCE FOUNDATION: Ninth Annual Report for the Fiscal Year Ended June 30, 1959**—Alan T. Waterman, Dir.—*GPO*, 274 p., illus., paper, \$1. Lists program activities and grants.

**THE NATURE OF THE CHEMICAL BOND AND THE STRUCTURE OF MOLECULES AND CRYSTALS: An Introduction to Modern Structural Chemistry**—Linus Pauling—*Cornell Univ. Press*, 3rd ed., 644 p., illus., \$8.85. Fully revised edition.

**NORMAL CHILDREN AND MOTHERS: Their Emotional Opportunities and Obstacles**—Irving D. Harris—*Free Press*, 287 p., \$6. Doctor points out the variety of normal behavior, illustrating his points with 54 concrete cases.

**NUCLEAR ELECTRONICS II** (Sessions 6-9)—Paul Brafford and others—IAEA (Int. Publications, N. Y.), 380 p., illus., paper, \$4. Proceedings of the International Symposium organized by the French Society of Radioelectricians, Paris 1958.

**NUCLEAR REACTOR MATERIALS**—B. R. T. Frost and M. B. Waldron—*Simmons-Boardman*, 79 p., illus., paper, \$2.75. Outlines for physicists and reactor engineers the present state of the art and science of reactor materials.

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RADIATION BIOLOGY: Proceedings of Second Australasian Conference, 1958—Australian Radiation Society, J. H. Martin, Ed.—*Academic*, 304 p., illus., \$11. Concerned with the interaction of ionizing radiation in living cells.

ROADS TO DISCOVERY—Ralph E. Lapp—*Harper*, 191 p., illus., \$3.75. Tells of the scientists who have advanced our knowledge of the atom, and explains its structure. For young adults.

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SOCIAL AND CULTURAL MOBILITY—Pitirim A. Sorokin—*Free Press*, new ed., 645 p., \$7.50. Reprint of classic, supplemented by chapter on "Genesis, Multiplication, Mobility, and Diffusion of Sociocultural Phenomena."

STEAM'S FINEST HOUR—David P. Morgan, Ed.—*Kalmbach Pub. Co.*, 128 p., photographs, \$15. Pictorial record, 16 x 11 inches, of 101 U. S. steam locomotives.

THE STORY OF DISSECTION—Jack Kevorkian—*Philosophical Lib.*, 80 p., illus., \$3.75. Historical account of the favorable and unfavorable influences which affected anatomic inquiry.

SWEET SUE'S ADVENTURES—Sam Campbell—*Bobbs*, 119 p., photographs by Charles P. Fox, \$2.95. About a mother skunk and her eight skunklets, for young readers.

SYMPOSIUM ON MICROSCOPY—Oscar W. Richards, introd. by F. F. Morehead—*Am. Soc. for Testing Materials*, 165 p., illus., \$4.75. Recent developments in light and electron microscopy.

THE TECHNICAL INSTITUTE IN AMERICA—G. Ross Henninger—*McGraw*, 276 p., \$6. Results of a national survey of technical institute education in America.

THE TEEN-AGE YEARS: A Medical Guide for Young People and Their Parents—Arthur Roth—*Doubleday*, 288 p., \$3.95. Discusses the special changes, illnesses and problems of growing up.

TELEMETERING SYSTEMS—Perry A. Borden and Wilfrid J. Mayo-Wells—*Reinhold*, 349 p., illus., \$8.50. On the practical aspects and possibilities of both stationary and mobile telemetering.

THE THEORY OF NUMBERS AND DIOPHANTINE ANALYSIS—Robert D. Carmichael—*Dover*, 226 p., paper, \$1.35. Reprint of 1914 and 1915 separately published editions.

TRAVEL GUIDE TO RUSSIA—Irving R. Levine—*Doubleday*, 416 p., \$4.95. Concrete suggestions on every phase of travel within Russia.

THE WIND: Nature's Great Voice—Ethel M. Campbell—*Denison*, 45 p., illus., by Norma Stevens, \$3. About the movements of the atmosphere over the surface of the earth. Elementary level.

THE WORLD ALMANAC 1960 and Book of Facts—Harry Hansen, Ed.—*N. Y. World Telegram (Doubleday)*, 75th ed., 896 p., \$2; paper, \$1.35. Reliable reference work, with survey of scientific feats of 1959.

Science News Letter, February 6, 1960

## PUBLIC HEALTH

## AMA Journal Hits Health Bill for Elderly

DOCTORS were warned of the dangers of supporting the compulsory health insurance program that would provide health care for elderly persons.

The program, known as the Forand Bill, introduced by Rep. Ami Forand (D.-R.I.), is before Congress. It supports Government-financed medical care for all who collect Social Security.

An editorial in the *Journal of the American Medical Association* (172, 130/344 Jan. 23, 1960) interprets the actual motivation of supporters of such legislation as this:

"The proponents of compulsory health insurance contend basically that the people—in this case Social Security recipients—should not be permitted to buy their own health care."

Opponents of such legislation, the editorial continues, and this presumably includes the AMA, support, instead, the basic principle that people should be permitted to choose freely how they wish to spend their own money. They urge programs to promote prosperity, maintain the purchasing power of the dollar, support the indigent, develop voluntary health insurance, and construct special facilities designed to meet the health needs of the aged, encourage home care and other appropriate measures.

The editorial criticizes "misleading statistics widely stated" and exploited by supporters of the Forand Bill such as that three-fifths of all persons 65 and over had less than \$1,000 in money income in 1956 and 1957. The AMA contends that this does not take into consideration family and non-monetary income, total assets and other resources.

The proportion of those over 65 who have \$2,000 or more or \$5,000 or more is higher than for any other age group. Furthermore, the Federal Reserve Board's annual Survey of Consumer Finances reveals that the liquid assets of those over 65 have grown faster than the assets of any other age group in the last 10 years, the editorial continues.

Yet the editorial admits that to date the seriousness of meeting the health problems of the elderly has not been accurately determined. However, last April, Arthur S. Flemming, Secretary of Health, Education and Welfare, submitted to the Committee on Ways and Means a report titled "Methods of Providing Hospital Benefits Other Than by O.A.S.D.I. Mechanisms (Social Security)."

That report stated three out of every four aged persons could prove need in relation to hospital costs of at least those costs that exceeded any protection they might have through private health insurance. Other figures recently compiled point out that there will be 18,000,000 aged 65 or over by 1962.

The AMA editorial denounced the Forand Bill as a "costly, irreversible program tailored to avoid the real problem. It is a fundamental deviation from the basic concept of the social security system."

Science News Letter, February 6, 1960



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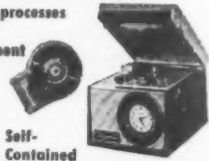
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NEW ELECTRIC THERMOMETER—INDICATES temperature remotely to 3000 ft. and up to five locations. Measures temperature of air, liquids, amateur weather men, orchard men, storage men, outside humidity. For students, science teachers. Send for brochure Electra-Temp. Co., Dept. 8, Box 6111, San Diego 6, Calif.

### GOVERNMENT SURPLUS

GOVERNMENT SURPLUS RADIOS, RECEIVERS, transmitters, gadgets, parabolic reflectors, infra-red sniperscopes, aircraft camera lenses. Amazing catalog 10¢. John Meadna, Malden 48, Mass.

### PLASTICS

NEW LIQUID CASTING PLASTIC, CLEAR COLORS. Embed real flowers, minerals, biological specimens, delicate instruments, electronic parts. Also cold setting resin and fiberglass for laminating, casting, molding, coating. Manual 25¢. Castolite Company, Dept. B-30, Woodstock, Illinois.

### ENGINEERING

## Midget Microphones Explore Jets' Roars

MICROPHONES no bigger than a letter of the type used in most newspaper want ads have been built to study the great roars of jet aircraft and rockets.

Flow instabilities figure in those roars, and also in other annoyances ranging from heart murmurs to cyclones. Prof. Erik L. Moloo-Christensen of the Massachusetts Institute of Technology department of aeronautics and astronautics proposes to pick flow problems apart with the help of these tiny microphones.

He and his associates are assembling apparatus now that will enable them to add known sounds to streams of air. These streams will be at known temperatures and pressures, and the researchers hope to learn what becomes of the added sounds. Thus more may be learned about how a jet carries and scatters its noise.

The National Aeronautics and Space Administration granted Massachusetts Institute of Technology \$70,000 last fall to support research regarding unstable shear flow for two years, and *The Technology Review* (Feb.) describes the experimental set-up devised for this research.

Although a central part of the apparatus is a pipe a foot in diameter and eight feet long, full of material to reduce the turbulence of the air sent through it, much of the work will be done with very delicate devices. In addition to the new, tiny microphones, the whispers in the wind will be detected with the help of very fine "hot" wires—so fine that they cannot be seen unless held "just so" in the light—and an array of other complex, modern instrumentation.

Science News Letter, February 6, 1960

### GENERAL SCIENCE

## Science Exam Answers

To check yourself, score two (2) points for each correct answer in Parts A and B; and one (1) point for each in Part C.

103.4-6.  
101.5-B; 101.6-E. 103.1-1; 103.2-4; 103.3-8;  
each: 101.1-C; 101.2-K; 101.3-J; 101.4-I;  
ANSWERS TO PART C—one point for  
Section N: 71.3; 72.1; 73.1.

for each: Section G: 50.1; 51.4; 52.2; 53.3.  
ANSWERS TO PART B—two points  
22.3.

for each: 3-2; 4-1; 5-3; 19-3; 20-1; 21-4;

ANSWERS TO PART A—two points

## Do You Know

The Polaris missile will bring within range of direct attack from the sea almost all important military targets within about 15 minutes.

The American public contributed a record \$24,004,865 to the 1959 Heart Fund.

## Kodak reports on:

what the big wheels do... the differing demands of art and photographic utility...  
film for photographing a tiny little speck in a great big sky

### A kind word for triacetate tape

We make base for magnetic tape. Our base is cellulose triacetate, the same as in Kodak Aerographic Films for precision mapping from aloft. We cast it from solution on the high miraculously smooth peripheries of 18-foot wheels like this one. In the 330° of rotation



allotted for preliminary evaporation of the solvents before stripping off as sheet, the thickness—along with any thickness errors—shrinks by 4/5. Except for infrequent replating, these prodigious wheels have been rotating with stately unbroken angular momentum night and day, winter and summer, weekends and workdays for a full generation of mortal man.

Not only do our tape-making customers rival each other in excellence of deposition, but our cellulose triacetate has a rival of its own in polyethylene terephthalate, which is known as polyester. Because of the slightly higher price of polyester tape, it has often been assumed on all counts superior. This misconception hurts us.\* The price difference at least partially stems from the higher salable yield that the tape manufacturer gets from cellulose triacetate. He has to reject less tape for deformation or "skew" and has the inherent thickness uniformity of the solvent-evaporation method to thank.

Though most of the tape being bought today is our beloved cellulose triacetate, there is a place for polyester. That we admit. It's very good for humidity amplitude and devilishly strong.

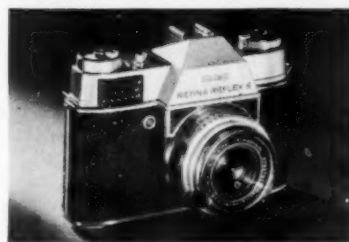
Cellulose triacetate, on the other hand, has only 15% ultimate residual elongation, not 45%. It does not go on

stretching and stretching when overloaded by apparatus design that leans too heavily on strength of the tape base. In many applications a stretch of large and unknown magnitude could have a sneaky effect on the results.

One other factor puts cellulose triacetate high with the man to whom the word "dropout" is an expression of horror. A dropout is caused by an inhomogeneity. Our cellulose triacetate, by the nature of its manufacture, is not likely to contribute inhomogeneity. Believe us.

*Don't write to us about the foregoing unless you just happen to be in a mood for correspondence. All we ask is that you bear our assertions in mind when the occasion arises to specify magnetic recording tape.*

### A Retina in front of your own



This, in our current and patently prejudiced view, is the best camera that money can buy, \$199.50 worth of money, to be specific.

This is the camera we recommend for the scientific worker who does not especially enjoy photography for its own sake but has decided to deprive himself no longer of its benefits to his work.

This camera is very handy for recording facts as they occur, under the widest variety of conditions and with the least thought to technicalities, least of all to the tiresome question of parallax. Even at only 5 3/4" film-to-subject distance, made possible by the supplementary lenses for closeups, the exact scene falling on the user's own retina as he presses the button will shortly be a 35mm color slide for projection. He sees the scene through the camera lens itself at its full aperture, with a split-image rangefinder view at the center of the ground glass. He can make pictures as fast as he can flip the lever, real pictures for which opportunity may have come rapidly, not just a succession of wasteful trial shots that grope for some usable combination of camera pointing, focus, and exposure. Judgment and arithmetic in choosing

proper exposure are replaced by the act of bringing two pointers into coincidence, one of them being photoelectrically actuated.

This camera, its wide-angle lenses, its telephoto lenses, and its specialized photo aids (such as for adapting to a microscope) all come from Kodak A. G. in Stuttgart, a plant devoted to the Retina system of photography. They make the taking of good photographs easy. Great photographs are another matter. Great photographs convey universal emotion and are works of art. A great and talented artist may not need a Kodak Retina Reflex S Camera, but neither does a Kodak Retina Reflex S Camera need a great and talented artist.

*They are still a little scarce at the camera shops. Please don't be angry if you have to come back a second time.*

### "Shellburst"—ask for that by name

Until now we have spent very little on advertising Kodak Linagraph Shellburst Film. Therefore the inquirer to whom we recommend it for speed, fine grain, high contrast, and sharpness gets the satisfaction of having been tipped off on something special. The antique, oddly militant name "Shellburst" sticks in the mind. The hydrogen bubble chamber people, for instance, have taken to it.

Now we announce an upward shove in the performance of this brand of 16mm, 35mm, and 70mm film for photographing a tiny little speck in a great big sky. The spectral sensitivity peak has been shifted from 650m $\mu$  to 680m $\mu$ . This decision was reached at the cost of a vast number of man-hours, not only in the laboratory but out on deserts and hazy hillsides. In the course of these labors, good optical reasons turned up for peaking at 680m $\mu$  instead of pushing out to the infrared.

Along with the extension of red sensitivity, the new Shellburst has been endowed with (2) half again as much speed for the same graininess, (3) a significant improvement in acutance that is particularly prominent at high densities, and (4) a hardening of the emulsion to permit speedy hot processing.

For processing recommendations and the names of dealers, write Eastman Kodak Company, Photorecording Methods Division, Rochester 4, N. Y.

*Price is list and subject to change without notice.*

\*Another thing that disturbs us is inclusion of cellulose triacetate under the generic term "acetate." Fortunately, cellulose diacetate is fast disappearing from the tape market.

**This is another advertisement where Eastman Kodak Company probes at random for mutual interests and occasionally a little revenue from those whose work has something to do with science**

**Kodak**  
TRADE MARK



# New Machines and Gadgets

For sources of more information on new things described, send a self-addressed stamped envelope to **SCIENCE NEWS LETTER**, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 1025. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

**INSECT ELECTROCUTOR** has a special black light that attracts insects to a high-voltage grid where they are killed instantly. It operates at the same cost as that for an ordinary light bulb. A metal mesh guard protects birds, pets and people against a non-lethal but unpleasant shock from touching the grid.

Science News Letter, February 6, 1960

**DISTANCE METER** for rapid and direct distance measuring in precision grinding processes operates in conjunction with non-contacting probes to provide a basically linear method of measuring distances from 50-micro-inches to one-half.

Science News Letter, February 6, 1960

**UNDERWATER LIGHTS** for swimming pools are designed to eliminate dangers of electric shock. A 12-volt type produces illumination equivalent to ordinary 400-watt, 110-volt lights, while a 24-volt type is equal to ordinary 750-watt, 110-volt models.

Science News Letter, February 6, 1960

**SHADE PULLS**, shown in the photograph, of plastic measure  $4\frac{1}{2}$  inches in width and  $2\frac{1}{2}$  inches in height. They are



quickly and easily slipped onto any window shade, eliminating the need for shade cords. The pulls are available in lustrous brass or silver plating that is easily cleaned.

Science News Letter, February 6, 1960

**STEREO MICROPHONE** for non-professionals consists of two microphone elements set at right angles and mounted in a single housing of strong, blue and gray

plastic. Its ruggedness makes it suitable for recording in the open air as well as indoors.

Science News Letter, February 6, 1960

**DESK ACCESSORY** consists of a gold-plated iron lamp post with personalized name shingle and a ball-point pen on a walnut-stained wooden base. Name is gold-stamped on black shingle.

Science News Letter, February 6, 1960

**MILKMAN'S REMINDER** is a weather-resistant plastic pegboard on which a housewife may indicate her dairy needs to the milkman. Several quantities may be designated in ten different categories of milk, cream, cheese and butter. A tilted slot on the back of the four-by-eight-inch board holds coins, milk tickets or notes.

Science News Letter, February 6, 1960

**FURNACE FILTER** features a double wall of polyurethane foam and a zipper opening to permit easy removal of the retaining frame. When "loaded" with dust, the filter may be cleaned safely and quickly by washing it by hand or machine with common household soaps or detergents.

Science News Letter, February 6, 1960



## Nature Ramblings



By HORACE LOFTIN

BARE, GRAY FIELDS lay on either side of the roadway. Telephone poles and wire only added to the bleakness of the scene. An automobile appeared in the distance, noticeably slowing in speed as it reached the spot. Though the car did not halt, a door was opened and a metallic object tossed on the shoulder of the road; then the car moved on.

Two sharp eyes saw all of this, regarding it with deep suspicion. But there was that object to be examined. What was that moving there? Yes! It was what he had been searching for. Caution to the wind, he rushed to the object, poked his finger greedily toward it—and he was caught!

Thus another sparrow hawk was captured by members of that small but growing group of sportsmen-naturalists, the bird banders.

The metallic object was, in this case, an ingenious trap called the "bal chatri," based on an ancient device used by East Indians to catch falcons for hunting. It is a simple pillbox-shaped frame covered in hardware cloth. Within the box is

### Trapping Birds of Prey



placed a mouse, English sparrow or other prey attractive to hawks. The "bait" moves about naturally and is completely unharmed. On top of the wire box there are placed a good number of one-inch nooses made of nylon fishing line.

When the sparrow hawk or other bird of prey sees the live animal in the trap from his perch on the telephone wire or nearby tree, he flies to the trap and tries to grasp the animal through the wire. His feet almost always enter one or more of the nooses which close on him and he is trapped. Neither bait nor hawk are harmed by this method, which is extremely efficient for catching birds of prey.

The purpose of this and other traps and nets used to snare birds is to place serially numbered aluminum bands on their legs, from which information on their migratory habits, age and other activities may be obtained. There are some other reasons besides scientific ones why sportsmen, housewives, lawyers and a host of others spend their free moments at this business of bird banding. The chief of these is obvious enough: it is a great sport. Unlike hunting with a gun, hunting with snares is not limited to a few species and there is no season on the hunt nor game limit. For those who have tried the sport, there is no thrill that compares with outwitting a wild bird, taking him captive harmlessly, putting your hand on him and sending him on his way.

Bird banding is not for the raw amateur, however. Care must be taken in trapping birds, properly marking and identifying them. Local experts are usually glad to help a beginner on his way. After a period of "apprenticeship," banding permits (and also bands) can be obtained from the U. S. Fish and Wildlife Service, Washington, D. C.

Science News Letter, February 6, 1960